Operating instructions

Control units for conveyors

EBC 10
EBC 10 S

BA

Rhein-Nadel Automation GmbH

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Declaration of conformity
as defined by
Low voltage directive 2006/95/CE
and EMC directive 2004/108/CE

Herewith we declare that the product complies with the following provisions:
Low voltage directive 2006/95/CE
EMC directive 2004/108/CE

applied harmonized standards: DIN EN 60204 T1
EN 60439-1

remarks:

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1 Technical data

1.1 Functional description

A control unit for motor drives with variable speed with a ratio of 1:4. The controller is used for dc drives with permanent excitation or shunt field from the mains to control the armature voltage. The mains line and the motor line, hard-wired, the operating elements are fitted onto the front panel of an
aluminium housing. The integrated overcurrent switch-of connects when overloaded temporally delayed on operational fault. This status is shown on
the display on the front panel. An internal motor sampling (IxR compensation) produces a sufficient
permanence of the set conveyor speed on alternating load. The minimum and maximum output voltage Umin,Umax, acceleration- and braking
delay T up T down, maximum motor current Imax and influence of IxR-compensation are continuously adjustable on the print. The motor can be started or stopped with an additional print in a potential-free way or with a switch contact. For interconnecting other control units a potential-free status output is provided for. In case of the EBC 10 S the motor line is of a plug-in type onto the controller.

1.2 EC - Conformity

The control device corresponds to the following regulations:

Low voltage directive 2006/95/CE
EMC directive 2004/108/CE

Please refer to the Declaration of Incorporation for the applicable standards.

1.3 Technical data

Mains connection	230 Volt ± 10%, 50/60 Hz
Armature voltage range	0...180 Volt DC
Max. armature current	3 Amp. DC
Overcurrent circuit breaker: Reaction delay Reclosure	 ca. 3 minutes switch off supply
Status signal	NPN-Transistor 30V, 0,1A
Suppression of interference	According to CEM directives
Protection	IP 54
Dimension without fastening and operating elements	90 x 175 x 117 (B x H x T)

2 Safety notes

The safety notes shall in any case be read and understood. Their observance secures the conservation of valuable material and avoids health impairment**.**

The symbol of the pointing hand is shown in these operating instructions at points, which must be particularly observed, so that recommendations, regulations, notes and the correct procedure of work can be observed, as well as damage and destruction of the machine and/or other equipment parts is avoided.

Electric danger,

eg. at work under voltage

Work at electrical equipment of the machine/equipment may only be carried out by a qualified electrician or by trained personnel under direction and supervision of a qualified electrician according to the electronic regulations!

All safety and danger notes at the machine / equipment must be observed!!

The electrical equipment of a machine / equipment must be examined regularly. Faults, eg. loose connections or damaged cables, must be eliminated immediately!

Before commencing operation make sure that the safety grounding line (power earth PE) is intact and installed at the connecting point. Only test instruments approved for this purpose may be used for checking the safety-grounding conductor!

3 Information for starting

Before the mains connection is made and the control unit is switched on, the following points must in any case be checked:

- Is the control unit closed properly and with all screws?
- Are the existing plug fixing devices locked into place/screwed down?
- Are all cables and ducts undamaged?
- Is the **INTENDED USE** guaranteed?
- Does the mains voltage indication comply with the local power supply network?
- Does the mains frequency indication at the oscillating drive comply with the local power supply network?
- Is the correct operating mode set at the control unit? (on that read explanation operating mode)

Only if all above mentioned questions can be answered with yes, the control unit can be put into operation.

The operating parameters for a conveyor/hopper delivered with the control box EBC 10 have already been adjusted in the factory. In case of a change of the control box the operating parameters has to be adjusted. The place of the operating parameters is shown in diagram 1.

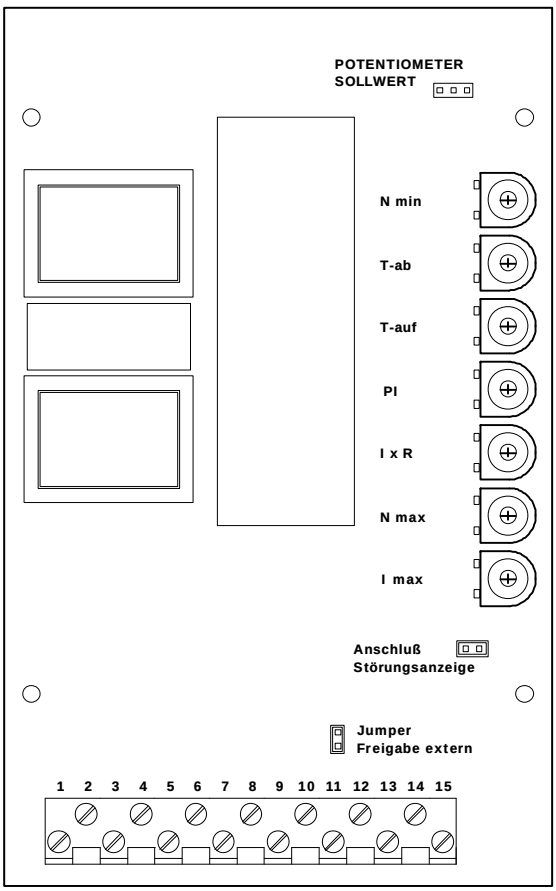


Abb. 1: Place of the operating parameters

Minimum speed adjustment.

Elapsetime of braking delay
Range 0,1 - 8 sec.
Elapsetime of acceleration.
Range 0,1 - 10 sec.

Control response of the voltage control.

Constant-speed control of different band loads.

Maximum speed adjustment.

Setting of max. armature current.

3.1 Setting the maximum engine speed

The adjustment is to be done with a speed ounter,the rated speed is shown on the name plate of the motor. The value of the armature voltage gives only
a conditional indication of spped, since the motor speed also depends of the local prevailing mains voltage. In case it would be impossible to read the
speed on the shaft of the motor, it is also possible to find it at the shaft of the conveyor. How to convert the ratio is found on the gear-box

3.2 Setting the minimum engine speed

The min. speed may not underrun 1/4 the max. speed, as a adequate cooling for the drive cannot be guaranteed. The smallest admissible speed is to be
found on the name plate of the motor with indication of the maximum speed.

3.3 Adjusting the maximum armature current

The correct adjustment of the armature current guarantees the full lifetime of the drive and an mimimum wear pf the carbon brushes. Measuring requires a counter TRUE RMS, a clamping device will not do. A measuring of the mains line is possible under consideration of the field current The current limit value may be calculated from : motor rated current / form factor. The motor rated current is indicated on the name plate, the form factor is normally 1,4. For a motor rated current of 3 Amp the current limit value will be 3 / 1,4 = 2,15 Amp.
The form factor is improved by the factor 1,1, in case a choke is looped in the armature circuit. In this case the current litmit amount to 3 / 1,1 = 2,73 Amp.

3.4 Adjusting the acceleration- and braking delay time

The adjustable acceleration- and braking delay allows to adapt the drive to the required application. Heavy loads may be accelerated thus to the required conveyor speed, without overburdening the drive, sensitive or components which can tip over can easily be accelerated in a controlled way or brought to a standstill.

3.5 Adjusting the Ix R compensation

Since the standard drives can be activated with a tachodynamo, keeping the adjusted speed however sable, the control unit is supplied with a compensation. When the armature current is increased the rated value automatically increases. The value of this increase determines the adjustment of the trimmer poteniometer I x R. The optimal adjustment is dependent from the dynamics of the conveying unit. The trimmer potentiometer can be changed such as to keep up the speed in case of
alternating load. When the speed is increased when the load increases, the influence of the compensation is to high and should be decreased.

3.6 Setting of the control reponse

The intervention of the dynamic feedback of the PI control is determined by the position of the trimmer potentiometer. If correctly adjusted and with
completely ondone acceleration- and braking delay the drive is running continuously when switched on to the mains or by remote control to the choosen speed and remaining there. If the intervention is too heavy, the speed changes occur in a cyclical way after the start-up. If the intervention is too small, the drive will overshoot that means that the drive is running at a higher speed level as required to end up finally to
achieve the correct speed.

3.7 Releasing the function by external components

The standard adjustment of the control unit provides that the oscillating drive starts, when the mains switch is switched on. If the control unit is to operate without mains voltage in start - stop - operation, the control unit is to be opened by observing the a. m. safety notes and the jumper JU1 must be removed. The blind plug at the side of the case replaces a screwing with strain relief size PG 9, here the cable for the release is put through. The release takes place in two possible ways:

Release by a contact

This simple, cost-efficient solution works in a way that the control unit is released by making the contact and the oscillating drive operates. The connection is made at the terminals FREE K. Some points should be observed:

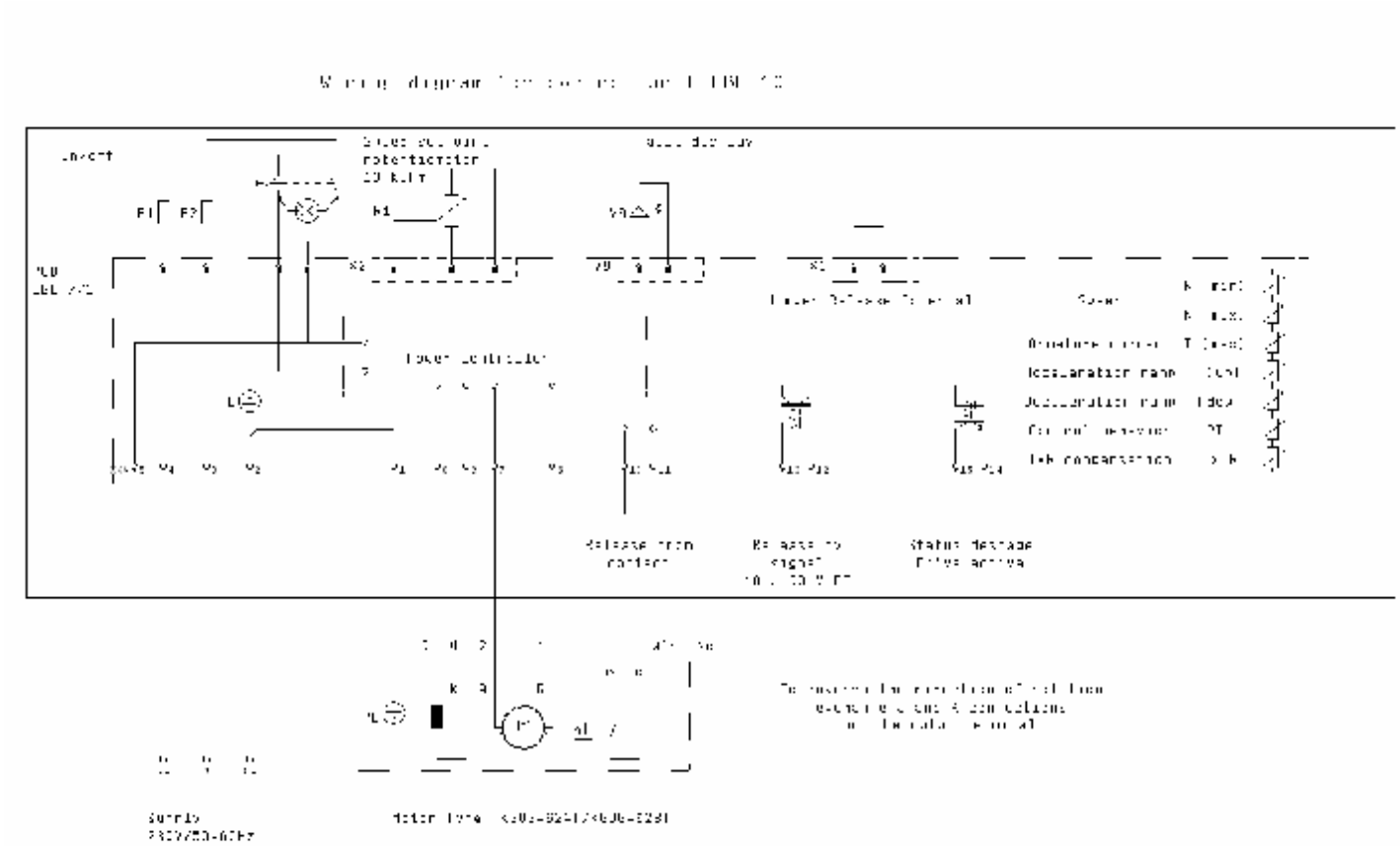
- The connection is fed with mains voltage! Cable type and colour, insulation regulations must be observed, the contact must of course be potential-free.
- The cable must be screened, the screen is on one side of the control unit on the grounded wire.
- The cable length should not exceed 5 meter.
- The cable may not be installed in immediate neighbourhood to high-energy switching equipments or strong interference fields.

Release by a voltage signal.
The terminals 10 and 11 must be beidged, the jumper ENABLE is to be removed from the print. The enable signal is to be connected at the terminals 12 and 13. The drive starts when a signal between 10 and 30 Volt dc is applied to the correct polarity. The input is protected against fals polarity. The use of an optocoupler in the control box provied a potential-free Input and allows installing unshielded cables of almost any length. Strewing in abundent energy should,however,be avoided .

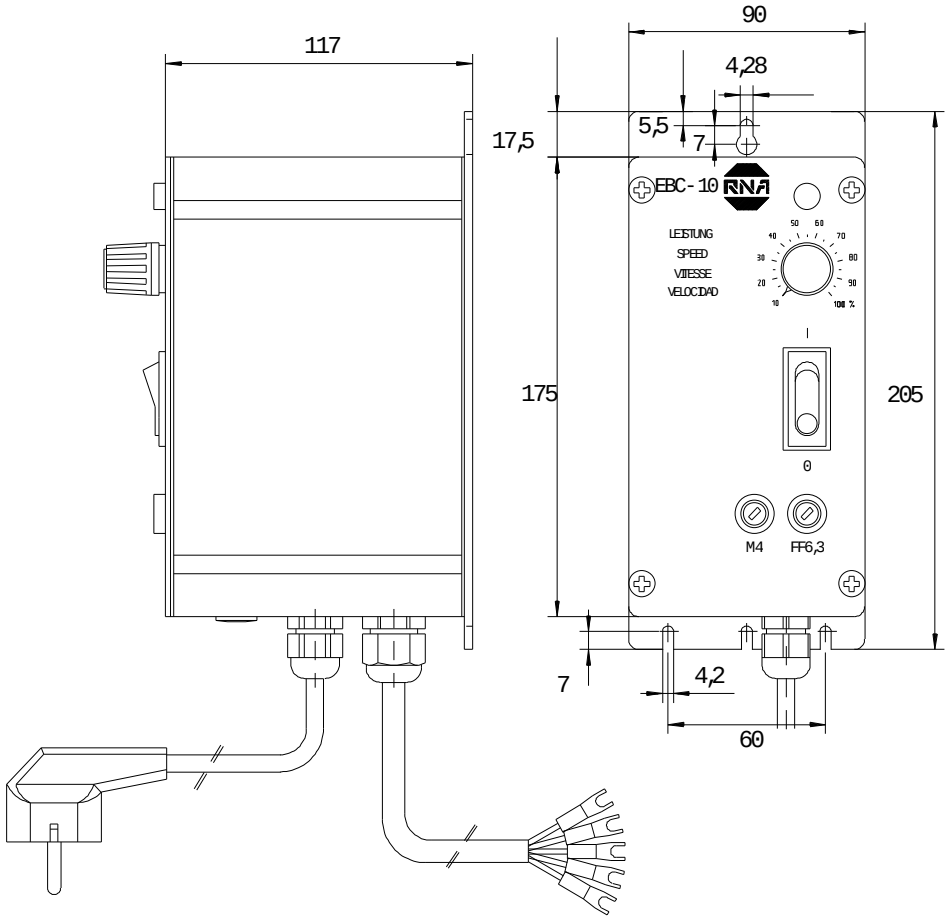
3.8 Status output.

The status output has a potential-free transistor track, which is always connected through when the controller is connected to the mains and the drive is running. The transistor is doped NPN and the connects voltages up to 30Volt DC with a max current of 100mA. To ensure the greatest possible general-use of the unit a protective circuit has been left out. In this case the duty of care is up to the end-user.

4 Connecting diagram.

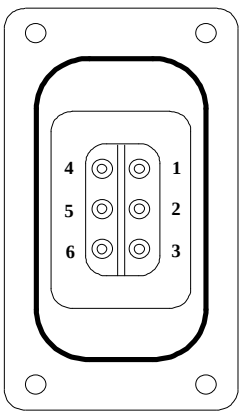


5 Dimensional drawing.



6 Assigment of the socket with EBC 10 S

Pin	Line	Motor connection



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